REMARKS

This Amendment is responsive to the Office Action dated March 26, 2007. Applicant has added new claim 59. Claims 1-59 are pending.

Claim Rejection Under 35 U.S.C. § 112

The Office Action rejected claims 1-50 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully traverses this rejection.

With respect to independent claim 1, the Office Action stated that "a control circuit to inhibit pulse skipping" is vague because nothing has been set forth to provide pulse skipping and pulse skipping cannot be inhibited if it is not provided.[1] Similarly, with respect to independent claims 18 and 35, the Office Action stated that "inhibiting pulse skipping" is vague because no step or means has been set forth to provide pulse skipping. Further, with respect to claim 1, the Office Action stated that "based on a level of the battery voltage" is vague because nothing has been set forth to measure battery voltage. Applicant submits that claims 1-50 as originally presented particularly point out and distinctly claim the subject matter which Applicant regards as the invention, as required by 35 U.S.C. § 112, second paragraph.

M.P.E.P. § 2171 provides guidance as to the requirements of 35 U.S.C. § 112, second paragraph, and states that a claim is definite when "the scope of the claim is clear to a hypothetical person possessing the ordinary level of skill in the pertinent art." The scope of each of claims 1-50 as originally presented is clear.

Applicant's independent claim 1 recites a control circuit to inhibit pulse skipping by the boost converter. Similarly, independent claims 18 and 35 recite inhibiting pulse skipping by the boost converter. In view of the language, "pulse skipping by the boost converter" recited in independent claims 1, 18, and 35, it is unclear how claims 1, 18, and 35 are vague with respect to the source of the pulse skipping, as the Office Action asserts. Applicant submits that it is clear that the boost converter provides the pulse skipping recited in claims 1, 18, and 35. Accordingly,

[1] Office Action dated 3/26/07, pages 2-3, item 5.

Applicant's claims 1, 18, and 35 define pulse skip inhibition with, at a minimum, a reasonable degree of particularity and distinctness.[2]

Additionally, claim 1 recites a control circuit to inhibit pulse skipping by the boost converter based on a level of the battery voltage. The intention of claim 1 is not to claim a device for measuring battery voltage, but instead to claim a control circuit that inhibits pulse skipping based on a variable, i.e., battery voltage. Regardless of the source of the battery voltage measurement, the control circuit inhibits pulse skipping in response to the battery voltage level at the input of the boost converter. Accordingly, claim 1 recites a programmer comprising a control circuit that inhibits pulse skipping by a boost converter based on a level of battery with, at a minimum, a reasonable degree of particularity and distinctness.

For at least the foregoing reasons, Applicant's independent claims 1, 18, and 35 particularly point out and distinctly claim the subject matter which Applicant regards as the invention, as required by 35 U.S.C. § 112. Applicant requests withdrawal of all rejections under 35 U.S.C. § 112.

Claim Rejection Under 35 U.S.C. § 102(e)

The Office Action rejected claims 1-3, 10, 11, 13, 35-37, 43, 44, 46, 51, 52 and 54 under 35 U.S.C. § 102(e) as being anticipated by Carbunaru et al. (U.S. Patent Application Publication No. 2004/0098068, herein referred to as Carbunaru). Applicant respectfully traverses the rejection. Carbunaru fails to disclose each and every feature of the claimed invention, as required by 35 U.S.C. § 102(e), and provides no teaching that would have suggested the desirability of modification to include such features.

For example, Carbunaru fails to disclose or suggest a medical device programmer comprising a wireless telemetry circuit to communicate with a medical device, a boost converter to convert a battery voltage to an operating voltage for the programmer, and a control circuit to inhibit pulse skipping by the boost converter based on a level of the battery voltage, as recited by Applicant's independent claim 1.

[2] M.P.E.P. § 2173.02 provides that that in order to meet the requirements of 35 U.S.C. § 112, second paragraph, a claim must define the patentable subject matter with a reasonable degree of particularity and distinctness.

Similarly, Carbunaru fails to disclose or suggest a system for controlling a power supply in a programmer for a medical device, the system comprising means for applying a battery voltage to a boost converter to convert the battery voltage to an operating voltage for the programmer and means for inhibiting pulse skipping by the boost converter based on a level of the battery voltage, as recited by independent claim 35.

Additionally, Carbunaru fails to disclose or suggest a neurostimulation system comprising an implantable neurostimulator and a programmer for the neurostimulator, the programmer including a wireless telemetry circuit to communicate with the medical device, a boost converter to convert a battery voltage to an operating voltage for the programmer, wherein the boost converter activates pulse skipping when the operating voltage exceeds a threshold value, and the boost converter is a fixed-frequency switching mode boost converter, and a control circuit to inhibit pulse skipping by the boost converter based on a level of the battery voltage, as recited by independent claim 51.

The invention of independent claims 1, 35, and 51 specifies that a battery voltage is converted to an operating voltage by a pulse skipping boost converter. Carbunaru makes no mention of a boost converter, much less a pulse skipping boost converter, and accordingly, cannot anticipate Applicant's independent claims 1, 35 or 51.

The Office Action characterized a switching regulator 603 in the Carbunaru device as a boost converter.[3] Applicant respectfully disagrees and submits that the Office Action appears to have misinterpreted the meaning of a boost converter, which is well understood among those skilled in the art. A boost converter converts one DC voltage level to another, higher voltage level. The switching regulator 603 described by Carbunaru does not convert an input voltage (24 VDC) to a higher voltage. Instead, with reference to FIG. 5 of Carbunaru, the output of switching regulator 603 is 6 VDC. Therefore, the Office Action incorrectly characterizes switching voltage regulator 603 as a boost converter, because switching regulator 603 receives a 24 VDC input and outputs 6 VDC.

Even if the switching regulator described by Carbunaru was relevant to the boost converter of the claimed invention, it does not employ pulse skipping. Carbunaru does not even mention the concept of pulse skipping. Accordingly, Carbunaru does not teach or suggest a pulse

[3] Office Action at page 4, item 9.

skipping boost converter. The Office Action also fails to identify any passage in Carbunaru that discloses inhibiting pulse skipping by a boost converter.

Inasmuch as it does not contemplate a pulse skipping boost converter, Carbunaru likewise fails to suggest inhibiting pulse skipping by such a boost converter, as required by the claims. In the absence of a pulse skipping boost converter, it is unclear how Carbunaru could have provided any teaching pertinent to inhibiting pulse skipping. Applicant respectfully disagrees with the Office Action's conclusion that "because the operation of switching regulator (boost converter) 603 is based on the input voltage measured by 602, pulse skipping is inhibited and activated based on the battery voltage."[4] Even if the operation of the switching regulator 603 taught by Carbunaru was based on an input voltage, which Applicant does not agree with, it is unclear how such dependence necessarily results in inhibiting pulse skipping, as recited by Applicant's claims, particularly in the absence of any boost converter that would employ pulse skipping.

Additionally, Applicant notes that the claimed invention relates to converting a battery voltage to an operating voltage and inhibiting pulse skipping based on a level of a battery voltage that is converted to an operating voltage for a medical device programmer. Carbunaru does not teach a programmer that includes a boost converter to convert a battery voltage to an operating voltage. Instead, Carbunaru focuses on recharging a battery 16 in an implanted stimulator 10, and communicating with the implanted stimulator. Carbunaru describes a base station 50 and a chair pad 32 with a coil 34 that inductively recharges battery 16 in stimulator 10 using power obtained from an AC power source adapter 52. The Office Action concluded that the device taught by Carbunaru is inherently capable of utilizing a battery voltage.[5] The Office Action reasoned that "although Carbunaru utilizes AC power with an AC-DC adapter . . . , this converted 24 VDC source could inherently be supplied by a 24V battery (the boost converter is capable of converting a battery voltage because the input voltage is DC)."[6] The Office Action appears to be relying on an improper finding of an inherent disclosure in Carbunaru.

In order to support a rejection based on inherency, the Office Action must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly

[4] Office Action at page 4, item 9.
[5] *Id.*
[6] *Id.*

inherent characteristic necessarily flows from the teachings of the applied prior art.[7] No teaching in Carbunaru reasonably supports a finding that Carbunaru teaches a pulse skipping boost converter, much less supports the assertion that the pulse skipping inhibition is inherently based on a level of the battery voltage. In fact, the Office Action acknowledged that Carbunaru utilizes AC power with an AC-DC adapter to supply power to the switching mechanism. Since Carbunaru teaches the use of an AC power supply and does not contemplate the use of a battery to provide an input voltage, the use of a battery voltage does not necessarily flow from the teachings of Carbunaru. Carbunaru does not suggest converting a battery voltage to an operating voltage and inhibiting pulse skipping based on a level of a battery voltage that is converted to an operating voltage for a medical device programmer.

There is no battery voltage in the Carbunaru charging system 39. The voltage level of the charged battery 16 in Carbunaru clearly does not qualify as the level of a battery voltage that is converted to an operating voltage using a boost converter in a medical device programmer, as claimed. The battery 16 described by Carbunaru resides in the implanted stimulator 10, and is the recipient of charging current from charging system 39, rather than the source of an operating voltage. On the other hand, Applicant's claims are directed toward converting a battery voltage to an operating voltage in a medical device programmer. The battery described by Carbunaru resides within implantable stimulator 10, not a medical device programmer. Carbunaru provides no teaching concerning conversion of a battery voltage within that programmer. Once again, Carbunaru fails to disclose or suggest a requirement of Applicant's claims.

Carbunaru fails to disclose each and every limitation set forth in independent claims 1, 35, and 51. Claims 2, 3, 10, 11, and 13 are dependent upon claim 1, claims 36, 37, 43, 44, and 46 are dependent upon claim 35, and claims 52 and 54 are dependent upon claim 51. These dependent claims are also in condition for allowance. For at least these reasons, the Office Action has failed to establish a prima facie case for anticipation of Applicant's claims 1-3, 10, 11, 13, 35-37, 43, 44, 46, 51, 52, and 54 under 35 U.S.C. § 102(e). Withdrawal of this rejection is requested.

[7] *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original); MPEP 2112.

Claim Rejection Under 35 U.S.C. § 103(a)

In the Office Action, claims 4-9 and 38-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Carbunaru. Claims 14, 16, 18-28, 30, 31, 33, 47, 49, 55 and 57 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Carbunaru in view of Meadows et al. (US 2003/0195581, herein referred to as Meadows), and claims 12, 15, 17, 29, 32, 34, 45, 48, 50, 53, 56 and 58 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Carbunaru or Carbunaru in view of Meadows. Applicant respectfully traverses the rejection. The applied references fail to disclose or suggest the inventions defined by Applicant's claims, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention. In particular, Meadows provides no teaching sufficient to overcome the basic deficiencies already discussed above with respect to Carbunaru.

For the shortcomings of Carbunaru relative to the claimed invention, including independent claims 1, 18, 35 and 51, and their respective dependent claims, Applicant generally refers to the discussion above with respect to the rejection under 35 U.S.C. § 102(e). However, Applicant addresses some of the additional statements made by the Office Action for purposes of illustrating how the applied references fail to teach or suggest the elements of Applicant's claims under 35 U.S.C. § 103(a) .

Carbunaru fails to disclose or suggest a transistor including a MOSFET that transmits the battery voltage, less a body diode drop of the MOSFET, to the boost converter when the transistor is OFF, as required by Applicant's claims 6 and 39. Carbunaru also fails to disclose or suggest a transistor including a MOSFET that transmits the battery voltage, less a resistor voltage drop, to the boost converter when the transistor is OFF, as required by Applicant's claims 7 and 40. Additionally, Carbunaru fails to disclose or suggest a transistor including a MOSFET that transmits the battery voltage, less an external diode drop, to the boost converter when the transistor is OFF, as required by Applicant's claims 8 and 41. Furthermore, Carbunaru fails to disclose or suggest a transistor including a back-to-back MOSFET pair having a first MOSFET and a second MOSFET, and a transistor that transmits the battery voltage less an external diode drop, to the boost converter when each of the first and second MOSFETs is OFF, required by Applicant's claims 9 and 42.

In support of the rejection of claims 6-9 and 39-42, the Office Action acknowledged that Carbunaru "does not expressly disclose that the boost converter is switched with a MOSFET transistor less a body diode drop, resistor voltage drop, external diode drop; or a back-to-back MOSFET pair."[8] Despite the deficiencies in Carbunaru, the Office Action concluded that it would have been obvious to one of ordinary skill in the art to modify the Carbunaru invention by providing resistors, diodes, and back-to-back transistors in the power regulators to produce desired operational voltages from a fixed source voltage and to isolate the transience of the load from the power source and vice versa.[9] Applicant respectfully disagrees with the Office Acton's conclusion of obviousness.

Claims 6-9 are dependent upon claim 4, which requires that the battery voltage is transmitted to the boost converter when the transistor is ON and the transistor turns OFF when the battery voltage exceeds a threshold voltage. Similarly, claims 39-42 are dependent on claim 38, which requires that the battery voltage is transmitted to the boost converter via a transistor, and further requires a means for turning the transistor OFF when the battery voltage exceeds a threshold voltage. Each of claims 6-9 and 39-42 recite a transistor that transmits a battery voltage to the boost converter when the transistor is OFF. In contrast, Carbunaru describes shutting down the coil drive amplifiers and power supply when the over voltage/current shut-down comparators sense that the AC adapter voltage is at least twenty percent above or below the nominal 24 VDC.[10] Carbunaru does not disclose or suggest delivering any voltage to the switching mechanism under these circumstances. Because Carbunaru teaches shutting down the power supply, Carbunaru teaches away from providing a voltage to the switching mechanism under these circumstances.

For at least these reasons, the Office Action has failed to establish a prima facie case for non-patentability of Applicant's claims 4-9, 12, 14-34, 38-42, 45, 47-50, 53, and 55-58 under 35 U.S.C. § 103(a). Withdrawal of this rejection is respectfully requested.

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[8] Office Action at page 5, item 14.
[9] *Id.*
[10] Carbunaru at paragraph [0078].

New Claims:

Applicant has added claim 59 to the pending application. The applied references fail to disclose or suggest the inventions defined by Applicant's new claim, and provide no teaching that would have suggested the desirability of modification to arrive at the claimed invention. For example, the applied references fail to disclose or suggest a battery voltage monitor that monitors a level of a battery voltage and a control circuit to inhibit pulse skipping by a boost converter based on the level of the battery voltage, as recited by claim 59. No new matter has been added by the new claim.

CONCLUSION

All claims in this application are in condition for allowance. Applicant respectfully requests reconsideration and prompt allowance of all pending claims.

In view of the clear distinctions identified above between the current claims and the applied prior art, Applicant reserves further comment at this time regarding any other features of the independent or dependent claims. However, Applicant does not necessarily admit or acquiesce in any of the rejections or the Examiner's interpretations of the applied references. Applicant reserves the right to present additional arguments with respect to any of the independent or dependent claims.

Please charge any additional fees or credit any overpayment to deposit account number 50-1778. The Examiner is invited to telephone the below-signed attorney to discuss this application.

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